

Processing Theory in Islamic Thought: A Comparative Analysis of Al-Mawardi and Ibn Khaldun with Implications for Islamic Education

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Abstract

Al-Mawardi and Ibn Khaldun devoted many thoughts to education. Both of them also described most aspects of language, transfer, memory, recalling, and moreover retrieval of information which is important in information processing theory. The purpose of this research is to describe and analyze the learning concepts of Al-Mawardi and Ibn Khaldun according to processing theory as a framework of analysis. The method used is library research which examines many of their works and most works which describe them as primary and secondary sources. The analysis technique uses the OMA system (Optimal Matching Analysis). The results of this research show that Al-Mawardi postulated many linguistic aspects and effective strategies for conveying information either orally or in writing. He tends toward depth level processing in which metacognitive aspects, self-regulation, and understanding of introductory language become the core keys. On the contrary, Ibn Khaldun appears to compare between two levels of processing, either depth or storage level. His unique thought differs from contemporary brain structure in which Ibn Khaldun describes that sensory becomes the foremost gate of information which will be input to the back brain with a certain operational system processed from front to back brain. Either Al-Mawardi or Ibn Khaldun have no far difference, but their similarity is that the urgency of linguistic understanding becomes an essential window for a person to recognize until they know. The conclusion is that they are the same in postulating depth level, but Ibn Khaldun not only focuses on that but also gives a theoretical concept of storing information integrally from front to foremost brain.

Keywords: information processing, Ibnu Khaldun, Al-mawardi, linguistic understanding

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Introduction

Al-Mawardi as a *Fuqaha'* who was also an Islamic political expert has made many contributions to the concept of education. He spoke extensively about education in ethical discourse such as the criteria for teachers and students as well as Islamic educational curriculum and learning environment (Jaelani, 2021). Behavior/ethics is shaped by nature and treatment. For this reason, it is not enough to shape it with education and teaching but must be practiced, trained, and habituated first. Al-Mawardi explained psychoanalytically the prevention and intervention steps toward some disgraceful traits from the affective basis such as arrogance, conceit, selfishness, lying, envy, and the formation of praiseworthy traits such as noble character, proportional shame, gentleness, generosity, honesty, and maintaining honor

(Nasir, 2015). He also provided a comprehensive educational approach for cognitive, affective, psychomotor, religious, social, and ethical/moral aspects. Even metacognitive strategies that emphasize self-regulation learning in learning success with collaborative processes and outcome orientation (Tigrīn Hūriyyah, 2023).

The balance of world and religion as Al-Mawardi's orientation in his distinctive learning concept where he opened the thought products of other civilizations that were pioneers in their time by comparison with the products of Persian, Greek civilizations, and thought elements in the East Indies region while remaining consistent with Islamic elements (Ibn 'Iwāḍ al-Mālikīy, 2022). This also exposes many human cognitive structures which are divided into 2: 1) *gharīzī* (innate); 2) *muktasab* (educable). This concept with the concept of human personality that he extensively discussed is very relevant to current education which emphasizes student learning outcomes that have religious-spiritual strength, self-regulation, intelligence, and noble character (Aulia et al., 2023; Ibn 'Iwāḍ al-Mālikīy, 2022).

Ibn Khaldun, who is no less prestigious in history and sociology, also discussed education extensively. The concept of human cognition, which for him is composed of 4 components in the form of *hayūliyy*, *tamyīziyy*, *tajrībiyy*, and *naẓariyy*, is relevant to Piaget's concept in his cognitive development theory. Even Ibn Khaldun's ideas include ideas relevant to Behaviorist, Cognitive, Social Cognitive, Constructivist, and Humanist learning theories (Asysyauqi & Arifin, 2023). He offered many methods such as emphasizing discussion as *malakah 'ilmiyyah* and not overly emphasizing memorization although it is important to play a role, *riḥlah*, providing examples, and even teachers are emphasized on mastery of learning psychology and good teaching techniques, something relevant in several articles in SISDIKNAS 2003 (Jaelani, 2021; Kurniandini et al., 2022). These various methods plus the *tadrīj* (gradual) method are very important in learning in any field, especially language. The compatibility of principles with 21st-century learning makes this concept suitable for bilingual Arabic language mastery (Ahmad Azhari et al., 2021). With basic considerations such as the existence of educators in the process of educating/seeking knowledge, sociological philosophical influence, scientific planning, and orientation toward the development of *'Aql* itself becomes an inseparable part of the two points above. Education is not passive but must be able to stimulate and encourage students' intellectual activities (Roji & El Husarri, 2021).

Viewed from its historical scarcity, which is very philosophical, language as texture and ornament, words are the veil that hides yet reveals the relationship between thought and understanding. They are exemplified by the *dhikr* formulas of the Sufis. Ibn Khaldun postulated the potential not only to work but also to remove the veil between sensual perception and inner perception, knowledge and vision, appearance and essence. For him, language is not as a lexicography of entities, but as an element in a carefully constructed whole informed by *bayān* and *balāghah*, invested with the power and greatest appreciation for humans who have access-communication. Poetry and prose work with words, and not with ideas. Ideas are secondary to (words). (Words) are their foundations (Cooke, n.d.). Thus, Al-Mawardi provides verbal rules in teaching to teachers in terms of ethics, effectiveness of student processing, and meaning (Madūr, 2015).

Information processing theory is a theory that emphasizes learning on the deep aspect that information is urgent where processing, storage, and retrieval of knowledge from the brain occurs in learning. Learning is a process of receiving information that will later be processed so that the results become learning outcomes. The interaction of internal and external conditions rather than Stimulus-Response is considered so that learning is an output from processing where *human capital* is formed such as verbal information, intellectual skills, cognitive strategies, attitudes, and motor skills (Risda et al., 2023).

Ibn Khaldun and Al-Mawardi seem to represent the idea of Information Processing. In the Muqaddimah itself, Ibn Khaldun describes the cognitive dimensions of processing bases such as *ḥissi mushtarak-khayāl-quwwah al-fikr-wāhimah-ḥāfiẓah* and its sub-aspects such as linguistics (see Ibn Khaldūn, 2004). Thus, Al-Mawardi in conceptualizing interactive learning based on processing that is actually natural in a person's interaction such as the *Qā'il-Mustami-'Ākhiḍ* component and the linguistic component of learning in terms of oral and written aspects are broadly interpreted (see al-Māwardi, n.d.). Both have ideas about how learning approaches also consider information that is received-filtered-stored. Indeed, both equally emphasize 'aql as the essence of learning because 'aql is the essence of humanity. This rationalization is why the researcher wants to raise the relevant ideas of Ibn Khaldun and Al-Mawardi in information processing learning theory with distinctive differences between the two figures.

Method

This literature research is used to explore the thought of information processing in Al-Mawardi's learning theory in *'Āḍab al-Dunya wa al-Dīn* and *Rutbah fī Ṭalb al-Ḥisbah* and Ibn Khaldun in *Muqaddimah*, *Ta'rīf Ibn Khaldūn*, *Idhḥāb al-Sā'il* as primary sources, while secondary sources include *Fikru al-Tarbawī 'inda Al-Māwardi* by An-Najadi and *Filsafat Insānīyah Ibn Khaldūn* by Zaid Ahmad and other secondary sources such as books and journals related to Al-Mawardi and Ibn Khaldun discussing processing thought in learning theory. With data collection techniques: 1) searching and collecting texts; 2) source criticism (verification); 3) making reflective notes; 4) text data interpretation; 5) historiography (Zed, 2014). Then the data was analyzed with 5 processes: 1) text criticism; 2) descriptive analysis; 3) inductive analysis; 4) collaboration and colligation; 5) Synthesis (Zed, 2014). So that text data is meaningful based on the processing learning theory framework, which later the data will be analyzed with the OMA (Optimal Matching Analysis) system which includes process methods as follows: 1) grouping; 2) typology arrangement; 3) making comparisons on compiled data typology; 4) removing data and typologies that are repetitive or overlapping; 5) matching data that have relationships/similarities in cluster units; 6) and then cluster data is matched and assembled into a text string. In short, there are only 2 processes: reduction and construction (Subagyo & Kristian, 2023). The validity of the data was reviewed with: 1) credibility as internal validity) which was done with source triangulation techniques; 2) transferability as external validity by reporting to the supervisor (1 doctor from UIT Tribakti) because this validity depends on other people's decisions based on detailed, accurate, systematic, and reliable reports; 3) dependence as reliability by being audited from process to results with guidance; 4) Confirmation as data objectivity where the process is the same as dependency.

Results and Discussion

Al-Mawardi's Information Processing Ideas

The most urgent entry point of information processing for Al-Mawardi is language. He views language as an urgency of learning. This requires someone in learning to adjust the language used in conversation according to community customs and according to time. In fact, he emphasizes in this type of study to clarify pronunciation (*faṣāḥah*), straightforwardness, audience acceptance, and cleanliness from expression defects (al-Najādiy, 2021). Because *al-kalām* (expression) is a representation of *mustawda'at al-domā'ir* (storage warehouse/LTM) and a means to transfer information about what is stored in the abstract (al-Māwardi, n.d.).

Because knowledge of *ma'nā* settles on words where its meaning is translated. Meanwhile, the teacher only becomes an intermediary who reveals meaning before the student. This condition requires a *sensory register* in the form of ears and eyes and needs to understand

the meaning contained. So that the selection of words succeeds through hearing that brings meaning that can be understood in the heart (al-Māwardī, n.d.). If this is not possessed by the student, for Al-Mawardi it will become the cause of the student experiencing *taqṣīr* (failure). For this reason, he emphasizes the importance of language delivered to students, the accuracy of words, and the relevance of language in learning. Types of supportive learning whose purpose is to understand the meaning of oral and written language (al-Najādiy, 2021). In line with Ebbinghaus Verbal Learning, that learning as an association between verbal stimuli gradually includes words, syllables that have no meaning. Its smoothness is influenced by its meaning, the level of similarity between items, and the duration of their separation (Schunk, 2012b).

Information Processing emphasizes a person's activeness while entering information received from stimuli through the Five Senses (Schunk, 2012b). In detail, Al-Mawardi's concept is in line with the Levels of Processing Theory which pleases in the order of information processing. Information is processed from physical surface (superficial processing), acoustic (phonology, sound), and semantic (meaning and as the deepest processing) (Schunk, 2012b). This is confirmed by Al-Mawardi's expression in the Parenting Concept: "The educator of small children should teach him the short letters from the Qur'an after he masters the basic letters (physical) and captures them with vowels (phonology/sound) and trains him so that he can pass them with habit" (al-Māwardī, 2002). For him, the digestion of information from words using his hearing aid will make it easier to understand a *meaning*. So it is not difficult to process/release it again (al-Māwardī, n.d.). This concept also seems in line with Chomsky's Psycholinguistic theory where language is divided into 2 levels: *surface structure* which includes words (phonemes) and syntax; and deep structure which is disguised which includes meaning (semantics) (Schunk, 2012b). The core concept in this processing is based on the words of the Prophet Muhammad (peace be upon him):

"Indeed, there are only three things stored in knowledge: the speaker (information sender), the listener (audience), and the taker." (al-Māwardī, n.d.)

This *al-kalām*-oriented information (speaking) has conditions where individuals can be saved from error and lack of capacity. Al-Mawardi provides 4 conditions for teachers as *al-qā'il* in learning the processing basis in this case:

Speaking with motive

For Al-Mawardi, a communicator who has no motive and purpose will speak without focus. Without maintaining good and subjective motives according to expectations, his words will be despised (not heeded) and his cognition is considered problematic (al-Māwardī, n.d.).

Speaking according to procedure

The communicator must arrange the conversation according to its syntax, because if not, like prioritizing what should be ended, it will appear hasty and contradictory, or vice versa, will appear incompetent (*'ajzun*) and relaxed (al-Māwardī, n.d.).

Adjust your needs

Without adjusting *hājah* (needs) and *kifāyah* (sufficiency), the communicator will continue to speak without limits. Al-Mawardi interprets *hājah* in this communication if it is not *taqṣīr* (short) and *takthīr* (much). A collaborative prescription signifying moderation in the speaking part. But a large portion is not bad like *bayān* (explaining) and motivating. If not, then shortening speech is better (al-Māwardī, n.d.).

Sorting the words used

Because the mouth is a human symbol in showing what they do not know (critical) and a means of scientific representation produced (transfer/verbalism). For this reason, *tahdhīb al-'Alfāz* (synchronization of words) and *taqwīm al-lisān* (articulation) are very necessary. For Al-Mawardi, the shrewd communicator understands *balāghah* (rhetoric), therefore the arrangement of rhetoric must be in accordance with *faṣāḥah* (articulation) by practicing until you get used to it. Without practice, the use of rhetoric will not be appropriate, which causes awkwardness of words and confusion of meaning. Because *balāghah* is the skill of speaking using the correct meaning to be placed on the correct words. The articulation of syntax together with the appropriate meaning content is what is *meant* by *balāghah* (al-Māwardī, n.d.).

In addition, teachers are required to have rhetorical skills that emphasize correct meaning, obtained in 3 ways (al-Māwardī, n.d.): (1) Heuristic clarification so that there is no doubt and globalization. (2) It can be placed in its division so that what is not appropriate does not cover the word and something appropriate is already contained. (3) Its meaning can be compared (*muqābalah*)

For Al-Mawardi, *muqābalah* has 2 types: *First*, the original synonym is not *pure muqābalah* but is called *Muqārabah* (equalization/synonym) because their meanings may resemble each other; *Second*, antonyms which are *original muqābalah* (al-Māwardī, n.d.). For this reason, *faṣāḥah* (articulation) is also obtained in 3 ways to form a good conversational exchange. Al-Mawardi mentions that the three are in the form of (al-Māwardī, n.d.): (1) Avoid rare uncivilized words so that the communicator is not awkward and conforms to norms. (2) Arrange the words expressed and imply words that feel inappropriate. (3) Words and meanings must be *Munāsabah* (interrelated) and *Muṭābaqah* (harmony).

Muṭābaqah is a word that synergizes with meaning as if reversed, its meaning remains in accordance with the word, no less and no more. Meanwhile, the meaning of *Munāsabah* can be collected in several pronunciations, such as in prevailing *'urf* (culture) or agreed norms (al-Māwardī, n.d.). Al-Mawardi also extensively mentions writing material factors because it makes information processing from shallow (phoneme) to deep (semantic) such as the use of general terms and formulas that have not been exposed in students' schemas. He emphasizes that teachers must shape learning if material processing is easy so that the semantic domain in the form of understanding is achieved (al-Māwardī, n.d.; al-Najādiy, 2021).

Indeed, individuals communicate their culture through language. The language possessed by groups of individuals shapes culture linguistically (Salkin, 2008). Because the pronunciation of Homographs (words that are the same in spelling as other words, but different in pronunciation and meaning) still varies with the grammatical function of society and the pronunciation of words still varies in dialect (Salkin, 2008). The Cooperative Principle seems to be emphasized by Al-Mawardi, a principle where communicators and communicants tacitly agree on common goals to produce maximum and mutually relevant information exchange. It is appropriate when Al-Mawardi mentions various contexts such as circumstances, social status in communication, and communication goals such as the communicant's understanding of the message presented by the communicator, because all of that affects the content and torin (situation) such as the use of polite forms (Salkin, 2008). This is what Estes means that processing can use cognitive mediators (language mastery) to associate stimulus words with their responses (Schunk, 2012b).

It is clear that Al-Mawardi expresses the importance of language that involves phonology (word sounds), syntax (word arrangement), and semantics (content meaning). Indeed, lack of phonological skills contributes strongly to difficulties in decoding written language, while disruption of syntactic and semantic abilities causes difficulties in reading comprehension. Because good reading skills originate from improvement in oral language (Salkin, 2008). Oral

language skills greatly contribute to developing literacy skills, especially in children's phonological awareness in reading literacy, which is the best predictor of early reading success (Salkin, 2008). This is evidenced by his statement: "As for giving *I'rab* (phonics) and avoiding vowel errors (sound), it is still considered from the correct way, while *Balaghah* (rhetorical/literary ability) is higher than it." (al-Māwardi, n.d.). This entry shows that in Information Processing, students' verbal mastery as *Mustami'* is very much emphasized first, appropriate when Al-Mawardi manifests deeply and complexly, because in verbal learning there are characteristics of *Serial* (sequential), *Paired-Association* (accompanying pairs), *free recall* (free memory). This verbal material memory is also by researchers dependent on its context (Salkin, 2008), WM-LTM processing competition, and Activation Level (Salkin, 2008).

This is strengthened by his explanation that when the understanding of *ma'na* (semantic) has been successfully processed, then it is recommended to continue the process of determining information by memorizing. According to him, this will make it tame (easy to access information), and remember it. Then this new information can be said to be permanent (al-Māwardi, n.d.). This is called *encoding* which usually emphasizes the meaning of information. Although memorization can be without meaning, Al-Mawardi emphasizes including *encoding* with *mnemonics* (ideas that support memory). This is very appropriate because it can enrich and develop material. In addition, he also conveys that the mental imagery process will be an addition to the two entries in the organization of Information (Schunk, 2012b). This is what is meant by *ākhd* in the processing structure based on the postulate of Hadith explained above.

Ākhd which includes the impulsive encoding entry on *mnemonics* (memory fixation) as the final part of the Depth Level of Processing. This shows that Al-Mawardi also supports the existence of a two-storage model (WM-LTM), because the tame (active) material he mentions is identical to WM. He speaks with *qalb mufkir* (thinking heart) (Schunk, 2012a). Because it is impossible to retrieve information without first encoding and determining in the cognitive structure. This is evidenced by his statement "Knowledge is netted with *qalb mufkir* (actively thinking heart), *lisān mu'abbir* (speech that speaks/expresses again), and *bayān muṣawwar* (explained explanation)" (al-Māwardi, n.d.). A concept where *qalb mufkir* which can be interpreted as WM to capture the explanation of information so that it can be drawn into the cognitive structure, then the withdrawal function of WM can be achieved through the executive control process (*lisān Mu'abbir*), the movement of knowledge in and out of WM, and as a form of verbal repetition by stating clearly or better known in mental imagery in encoding (Schunk, 2012a). *Bayān muṣawwar* is very helpful in encoding and retrieving from *mnemonic results* because it can connect information that must be remembered with other knowledge (Schunk, 2012a). Al-Mawardi offers the *mnemonic process* with *practice* (repetition) in the form of *kathrat dars* (multiplying studies) and *'idāmat naẓr* (perpetuating viewing information) for *encoding* (al-Māwardi, n.d.). Indeed, repetition will work well in encoding and remembering lists of items in a short time. For the long term, more strategies are needed besides *practice* (Santrock, 2015). For this reason, he also emphasizes *muṭāla'ah* (studying) and referring back to learning sources to store information (al-Māwardi, n.d.).

Before entering WM, Al-Mawardi also says that information related to sensory memory, *'aql* according to Al-Mawardi, is the science of findings of the Senses in *darūriy*. Indirectly, the needs of the Senses become a factor that can support a person's learning success. The structure of *Aql* besides *mubtada' bi nufūs* (self-existence) there are also those that must go through *idrākāt ḥissiy* (sense findings) such as the five senses that produce *'idrāk* such as smelling, smelling, seeing, hearing, and touching. The completeness of the Senses is mandatory because for Al-Mawardi, when someone wants to know (al-Māwardi, n.d.). Clearly this is the

whole concept of the dual storage paradigm that begins with the *sensory memory register/WM-LTM*.

In addition to verbal imagery, he also emphasizes recording in writing to reject forgetfulness and *Syaki* (change in memory). This is based on the hadith of the Prophet Muhammad (peace be upon him):

"Strengthen (memory) knowledge by writing." (al-Māwardi, n.d.)

The idea of note-taking can indeed help evaluate which ideas need to be remembered and organize material so that learning goes well (Santrock, 2015). In line with the activation view, Al-Mawardi seems to emphasize repetition to activate information; if not repeated, information will be lost over time. The Executive (control process) that he emphasizes to store information with *practice* (repetition) in the form of clear statements in the form of *al-Kitāb* (writing). Al-Mawardi's assumption reminds us that WM is limited in duration, in line with Peterson's findings that long intervals between individual attention and information received worsen their memory (Schunk, 2012b). Regarding LTM, Al-Mawardi does not implicitly provide information, but in one of his work sessions he stated the tendency of the Prophet's Hadith which shows that LTM exists:

"Indeed, the back part of the brain is the place of storage." (al-Māwardi, 2002)

Al-Mawardi assumes that written and oral information can inhibit meaning. In this case, there are several problems that cause it. Including:

Errors in received speech (information)

This is not deserted because of 3 reasons: (a) Brevity of words in interpreting a meaning, so that the intention and actual meaning cannot be netted; (b) Excess words in covering a meaning, so that the original meaning is wrapped with excess; (c) Placement in certain terms deliberately done by the source, so that understanding is not achieved because the listener (student) does not have prior knowledge. According to Al-Mawardi, these three things can cause problems in the form of the emergence of new meanings/meanings not intended by the teacher (speaker/writer) and also not understood by the student (listener/reader) (al-Najādiy, 2021). Language disorders in normal children who have adequate opportunities to learn language but are still lagging behind are indeed rooted in perceptual problems (Salkin, 2008). For this reason, Al-Mawardi recommends the importance of understanding language such as formulas and word games/riddles to make it easier to understand and generalize meaning. In addition, both examples are intended to sharpen students' cognition. Therefore, the use of language must be in accordance with students' cognition and knowledge. So that learning is efficient, not troublesome, and efficient. Because good learning content always prioritizes students' knowledge of the language terms used (al-Najādiy, 2021). As expressed by Brunner and Kiethes.

Communicator problems

Sometimes it is original in himself (*fī dhātih*) or a new factor that causes it (*tāri' 'alaih*) (al-Najādiy, 2021).

Factors and Writing Errors

Information retention is very important because forgetting potentially inhibits withdrawal. Al-Mawardi sees that there are 2 things that cause forgetting: (1) *Shubhah* (obscurity) that affects meaning. This results in perceptual barriers to bringing up meaning and

the essence (truth) of meaning also cannot be produced. (2) Many thoughts that cross someone's mind that collide with each other with peace of mind (soul).

To overcome the first problem, Al-Mawardi recommends that as often as possible, one should not even be free from *mudhākarah* (remembering) and *munāzarah* (desiring). Regarding the second problem, he recommends focusing on knowledge with the encouragement of many aspirations (motivation) to achieve knowledge and not others (al-Māwardi, n.d.). This information retrieval is indeed closely related to how specific information is encoded. Indeed, the way of encoding (*munāzdirection*) knowledge determines the withdrawal signs that can activate knowledge effectively. It is natural that the absence of signs (*shubhah*) can affect withdrawal. For this reason we can direct *direction direction* to the determination of signs so that when signs are not, withdrawal depends on the effort to remember (*mudhākarah*) on each proposition (Schunk, 2012b). In addition, this repetition will store information in WM as well. In line with Processing Theory, Al-Mawardi seems to place *mudhākarah* as maintenance repetition (*maintenance rehearsal*) by repeating it many times while *munāzarah* as elaborative practice by connecting information with something already known (Schunk, 2012b). For this reason, Al-Mawardi assumes that forgetting is not caused by loss of information, but because of barriers. *First*, from the concept of *mudhākarah* and *munāzarah* that he explained, shows that barriers occur because of weak initial encoding. *Second*, many changes/merging of information that we usually combine with other information as in Al-Mawardi's language "*many thoughts that arise in the mind*" (Schunk, 2012b).

From this explanation, it shows that Al-Mawardi is categorized in Structural Theory in the form of: Classical Information Processing and Psycholinguistics.

Ibn Khaldun's Processing Ideas

Ibn Khaldun views language as a type of learning, somewhat different from skills that emphasize *ṣanā'ah*. In language, especially other languages (which a person does not possess), it is very possible to be learned like other *Malachak*. Ibn Khaldun provides language steps by cognitively memorizing conversations and directly representing them so that language ability is achieved (Ibn Khaldūn, 2004).

According to Ibn Khaldun, besides *kaifiyyah* (way) that he explained, speaking must also be accompanied by *sālim al-ṭabī'iy* (normal state of mind) and good understanding. With this, humans can express what is not appropriate in thought, language, and devices in the arrangement of words. In addition, to maintain compatibility between the language used and the conditions in which the language is used (Ibn Khaldūn, 2004).

The importance of learning a language, Ibn Khaldun provides an extraordinary explanation in this case. According to him, the discussion of knowledge is always framed in *Ma'na Khayālaniyyah* (perception) and heart meaning. The continuity of the heart meaning is *'aqliyyah* and *ma'nā Khayal* is *shar'iyyah*. Language also becomes an intermediary for humans to convey what is in their hearts, namely *ma'nā*. To get there, humans need to look at each other to exchange ideas and teachings. Language and words are intermediaries as well as a veil that must be passed between hearts besides connecting and intermediating in getting *ma'nā* from others. Therefore, it is obligatory for a person to capture *ma'nā* that is wrapped with lafad by knowing *dalālat alfāz* (signs of lafad/orthography), so that *ma'nā* (semantic) can be received and resolved in oneself until one can absorb the same *ma'nā* on another occasion without needing to prepare beforehand and has been able by itself (Ibn Khaldūn, 2004).

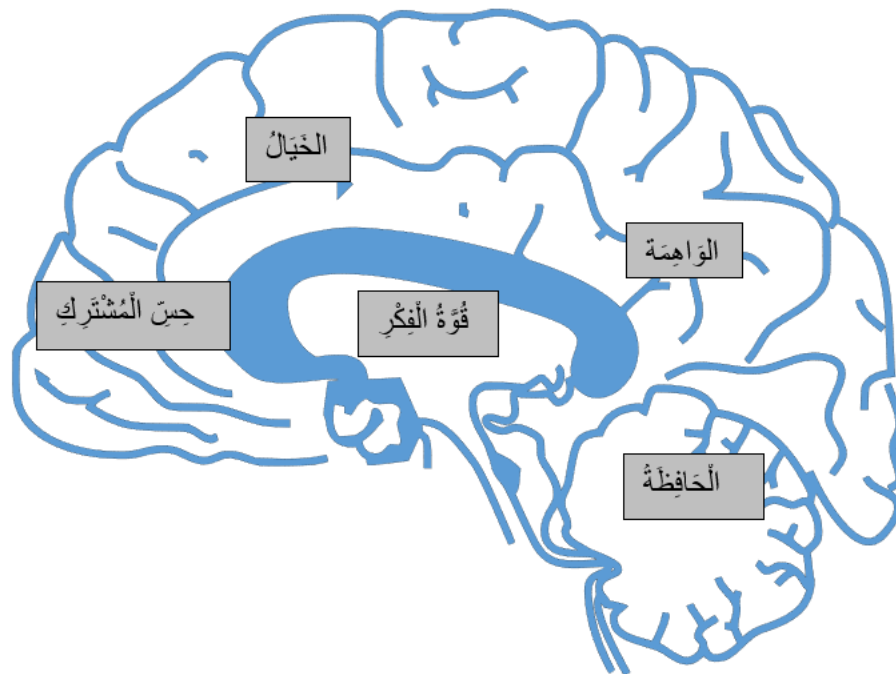
Ibn Khaldun in this case, is based on human *idrāk* (findings) related to physiological aspects. There are 2 *Idrak* in humans; *Empirical* (real) with sensory media and rational (i'tibar) with the brain. He strongly disagrees with the opinion of Aristotle, Al-Farabi, and Ibn Sina who

stated that '*Aql fa'al*' (potential reason) which is sourced from the level of *ruhāniyyah* is the stage at which humans know opens the horizon of *Hissi* (reality). This is based on their view that the *relationship of 'aql fa'al*' is above empirical scientific findings. The absence of this sensory intermediary for Ibn Khaldun is impossible. Whereas humans are veiled with *Hissi* which always requires tools to capture empirical objects. For him, this human consists of 2 aspects: *rūhāniy* (spirit/soul) and *jasmāniy* (body) that surrounds it. Both have independent findings whereas the output of their findings is only centered on the *rūhāniy aspect* (in the form of mental/mental). This *rūhāniy* richness is so rich that a person can *idrāk* (find) without intermediary, whereas *rūhāniy* with its limitations in the empirical realm alone cannot find (*idrāk*) except with the help of motor tools such as the body, brain, and senses (Ibn Khaldūn, 2004).

Humans are usually cognitively *mudrikah* (discoverer), for this reason the completeness of cognitive features and normal brain is very much emphasized by Ibn Khaldun. Usually the brain structure is divided into several parts from how information is processed. Ibn Khaldun divides the brain into 3 parts as follows:

Figure 1

Ibn Khaldun's Brain Processing Construction



Front Brain (Baṭn al-Awwal min al-Dimāgh)
Ḥiss al-Mushtarak

Power as a tool to receive impulses of an object scanned by the senses whether visible (visual) or heard (audio). Ibn Khaldun calls this a sensory input device, because captures cannot enter simultaneously by themselves. For this reason, it is necessary to have an input device to automatically enter sensory captures simultaneously. Because the senses themselves cannot do it without this sensory memory. This part is at the very front in the front brain (Ibn Khaldūn, 2004). In line with Piaget that knowledge and experience underlying *intermodal perception* is obtained by sensory experience (touching the outside world), but Ibn Khaldun does not say the senses are separate. He seems to hybridize between two perceptions of sensory coordination,

that perceptual information from the beginning is not differentiated and then increasingly differentiated. Therefore, babies cannot distinguish which sense is being stimulated. With the term *Hiss al-Mushtarak*, the senses become increasingly coordinated. Besides the developmental path, Ibn Khaldun is correct because this part of the brain functions to integrate information across all sensory systems which is very important in everything, especially learning (Salkin, 2008).

Al-Khayāl

Style as a tool to form projections of captured objects that enter from *Hiss al-Mushtarak* mentally with the same form as the original. Precisely behind *Hiss al-Mushtarak* in the front brain (Ibn Khaldūn, 2004). This front brain is very similar to the Sensory Register concept which states that each sensory information has its own register that stores information for a short time (*Hiss al-Mushtarak*) in the same form as when received (*al-Khayāl*). Indeed, sensory registers can work in parallel and simultaneously with each other through their registers. Not only that, the sensory memory studied is generally in the form of *iconic* (vision) and *echoic* (hearing) (Santrock, 2015). Ibn Khaldun's details in explaining Sensory Register with 2 separate performance divisions are not included in Information Processing theory.

Midbrain (Baṭn al-Awsāt min al-Dimāgh)

The power that drives all information processing systems at various layers. Ibn Khaldun names it *Quwwat al-Fikr* (power of thinking/cognitive). The power that triggers the emergence of movements to see/observe and movements to direct oneself such as thinking. So that mental/soul with *Quwwat al-Fikr* always moves because the instinct in humans is to purify (solve) findings and strong findings that can prepare humans to carry out real activities with the encouragement of thought. Ibn Khaldun names this aspect *Awwal al-Marātib al-Ruḥāniyyāt* (the first step of the spiritual aspect) (Ibn Khaldūn, 2004). In line with Zull, movement indeed originates from cognition that is expressed (Salkin, 2008). This is called *Working Memory/Short-Term Memory*, conscious mind memory that can be immediately accessed. However, Ibn Khaldun is broader than Processing Theory which only lists the function of WM as a maintenance, retrieval, and control (executive) process where the information processing process is contained in WM and the movement of knowledge in and out. Ibn Khaldun is correct in this case because WM plays an important role in learning (Schunk, 2012b). More than that, he seems to consider *Quwwat al-Fikr* as the driving force of human action and discoverer, not just information processing. Clearly, if we assume that it is discovered, it is discovered, not constructed.

Back Brain (Baṭn al-Mu'akhhkar min al-Dimāgh)

Al-Wāhimah

A processing tool that receives information from *al-Khayāl* to be processed into meaning related to personal relationships, such as perceptions of object properties related to personal justification. He gives examples such as hostility done by Zaid, honest Umar, and the compassion of his father (Ibn Khaldūn, 2004). In line with Wertheimer, Ibn Khaldun also seems to reject perception interpreted as the sum of a person's sensory experiences. But this is more a perception formed through visible movements (*Phi Phenomenon*), where perception is formed by subjective experiences that cannot be explained by objective elements even in order to convince objective meaning (Ibn Khaldūn, 2004). As with the Ventral perspective in brain development, the formation of perception and cognition of objects and their significance does not depend on a particular point of view of the object, but personal firmness allows object characteristics to be maintained in perception in different displays (Salkin, 2008). This perception is related to bottom-up processing related to knowledge in LTM (*al-Ḥāfiẓah*). Because the type of information a person obtains will explain the existence of different

meanings they give to objects that have been captured (Schunk, 2012b). It is very appropriate that the position of *al-Wāhimah* is close to *al-Ḥāfiẓah* which notably is a knowledge storage that influences perception. But Ibn Khaldun is more inclined toward prototype matching, an abstract form that contains basic elements of stimuli stored in LTM for identification (Schunk, 2012b).

Al-Ḥāfiẓah

This stage functions to assign all information in the form of shadows/images (mental images). Ibn Khaldun makes an analogy like *Khizānah* (closet/warehouse) that is ready to be used to store knowledge when needed (Ibn Khaldūn, 2004). In Information Processing Theory, this is called *Long-Term Memory*. A type of memory that stores many memories for a long time and is relatively permanent (Santrock, 2015). Ibn Khaldun's analogy above seems the same as the Information Processing Theory analogy that equates the human mind with a library, which is considered the best analogy (Santrock, 2015). It is clear that *al-Ḥāfiẓah* is not only a storage device but also a retrieval device to create perception like previous information.

In voicing sound *in the brain*, Ibn Khaldun seems to collaborate on macro-inter systemic sound that describes the brain as an environmental phenomenon in terms of metaphorical analogy (computer hardware) and micro-intrasystemic sound that reflects brain activity from within human units although he only exposes complex neuro-chemistry (Salkin, 2008).

Ibn Khaldun's processing concept seems more complete than Baddeley's Concept which formulates 4 processes (*input through sensory memory-phonological loop/repetition and visual/spatial working memory {Central Executive}-LTM*) even exceeding the Atkinson-Shiffrin concept in the form of *sensory input-sensory memory (attention)-WM (training)-LTM (storage and retrieval)* (see Santrock, 2015). Ibn Khaldun offers 5 processes in the form of: *Ḥiss al-Mushtarak* (sensory register) - *al-Khayāl* (sensory memory) - *Quwwat al-Fikr* (WM) - *al-Wāhimah* (perception) - *al-Ḥāfiẓah* (LTM). From this evidence we can detect that Ibn Khaldun is included in Information Processing and Cognitive Theory.

Table 1

Differences in Al-Mawardi and Ibn Khaldun's Processing Concepts

No	Al-Mawardi	Ibn Khaldun
1	Processing in the form of Depth Level starting from shallow-acoustic-semantic (deep). Two storage levels (WM-LTM) are not very visible.	Information processing as a combination of depth level (from shallow to deep) and processing of 2 storage levels (WM-LTM)
2	Processing hierarchy includes <i>Qā'il</i> (communicator)- <i>Mustami'</i> (communicant)- <i>Ākhd</i> (encoder/retrieval)	The basic reason for language processing is psychological health that promotes good understanding. Because science is framed in imaginative meaning and heart meaning. Language plays a role in conveying meaning from communicator to communicant to be processed.
3	Encoding does not have to be accompanied by the meaning of information, but with understanding and interpretation.	
4	Mnemonic as information determination is done with practice and much review and perpetuation of repetition at shallow processing (<i>idāmat al-nazri/register-sensoric</i>)	

5	<i>Idrāk al-hissi</i> (sensory register), WM (<i>Qalb mufkir</i>), Verbalization (<i>lisān mu'abbir</i>) and <i>bayān muṣawwar</i> (interpreted explanation). As a concept of 2 Storage. LTM is represented by mnemonics (<i>hifẓu</i>) whose place is in the back of the brain.	The processing process is based on brain structure (brain): 1) Front brain: <i>ḥissi mushtarak</i> (sensory register)- <i>khayāl</i> (sensory memory); 2) Midbrain: <i>quwwat al-fikri</i> (WM) not only the process of storing, retrieving and controlling executive (in-out) information but as the essence of human agency; 3) Back brain: <i>wāhimah</i> (successor of <i>khayāl</i> for processing meaning/raising perception/assumption)- <i>ḥāfiẓah</i> (LTM/warehouse/ <i>Khizānah</i>)
6	Forgetting occurs because of <i>shubhah</i> (obscurity) and many thoughts that cross the mind.	
7	Ways to activate information because of <i>shubhah</i> are <i>mudhākarah</i> (maintenance rehearsal/repetition many times) and <i>munāẓarah</i> (elaborative rehearsal/connecting one information with other information).	

Al-Mawardi seems to emphasize more on understanding and determining information, because of that he only clearly describes the Depth/Processing level, different from Ibn Khaldun who collaborates with the 2 Storage model and its hierarchy. Although not explaining how to determine and about forgetting, the concept quite reflects a clear process. While Al-Mawardi is applicative, it can be felt like repetition, the meaning of information makes it easier to memorize, for that the depth level is very much emphasized as the intensity of behavior change in the form of understanding that does not have to be in the form of direct action but mental.

Although Al-Mawardi's Depth Level must require processing first at the surface stage (phonology) mandatorily. Different from the current Depth Level Theory which does not apply to it and does not have to go through stages (Schunk, 2012b). He still emphasizes the memorization process although the memorization session can be without the previous process in the form of understanding. But he points to the meaning of the processing itself which is oriented to understanding information. What is more unique is that although Al-Mawardi does not implicitly mention 2 model storage, he includes Nash evidence from the hadith of the Prophet (peace be upon him) which shows that it is LTM, and WM is projected as *muftir qalb*. Something not included by Ibn Khaldun with a broad description of 2 more complex storage processes than the Processing Theory itself which only lists *Sensory Register-WM-LTM*. Ibn Khaldun mentions 5 stages of the process.

Conclusion

Al-Mawardi and Ibn Khaldun proved to represent concepts relevant to Information Processing learning theory. The difference between the two lies in the depth system and storage level, but Ibn Khaldun compares 2 simultaneously while it is enough for Al-Mawardi, although Nash narration/hadith supports the storage level. Although they were pioneers with other fields, it turns out their thought and breadth of knowledge also shows how information processing model learning works with differences between the two.

Conflict of interests

The author declares that he has no conflict of interest.

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